

In the Abstract:

Please amend and replace the abstract provided on a separate sheet herewith.

REMARKS

Reconsideration and allowance of this application, as amended, is respectfully requested.

This amendment is in response to the Office Action dated July 3, 2002.

By the present amendment, page 38 of the specification has been amended to include reference to the layer 72A and 72B in Fig. 19. Also, the abstract has been amended to delete the use of the "said." In addition, the title has been amended. By virtue of these changes, reconsideration and removal of the objections set forth in paragraphs 3, 5 and 7 of the Office Action is respectfully requested.

With regard to the objection to the headings set forth in paragraph 9 of the Office Action, reconsideration and removal of this objection is respectfully requested. It is respectfully submitted that the guidelines set forth in the Office Action are only guidelines, and not requirements for the exact labeling of headings. The headings set forth in the present specification are clear, and similar to the guidelines suggested in the MPEP. Accordingly, removal of the objection to the headings is respectfully requested.

With regard to the points raised in paragraph 2 of the Office Action concerning the listing of references in the specification, applicants are filing an Information Disclosure Statement providing an abstract of one of the documents listed on page 5 of the specification. With regard to other documents listed on page 5, it is noted that

th February 7, 2002 IDS provided copies of these documents and a form PTO-1449 listing these documents. It is respectfully requested that the Examiner consider and initial both the abstract filed in the Information Disclosure Statement presently being filed with regard to Japanese document 09-015773, as well as the three Japanese documents provided with the February 7, 2002 IDS.

Turning to the claims, reconsideration and removal of the objection to the claims set forth in paragraph 8 of the Office Action, as well as the 35 U.S.C. 112, second paragraph, rejection set forth in paragraph 11 and the 35 U.S.C. 103 rejection of claims 3-5 and 9 over Arakawa (USP 4,497,875) is respectfully requested. By the present amendment, claims 1-18 have been cancelled, thereby obviating these rejections. In place of claims 1-18, new claims 19-25 have been provided. These claims have been drafted to avoid the multiple dependency problems noted in paragraph 8 of the Office Action. In addition, these claims avoid the language questioned in the 35 U.S.C. 112, second paragraph, rejection. With regard to the prior art rejection based on Arakawa, it is respectfully submitted that claims 19-25 clearly define over Arakawa. For example, independent claim 19 sets forth the feature of the present invention that the composite material contains cuprous oxide in an amount of 20-80vol%. In addition, claim 19 defines that the composite material is centered. Arakawa fails to teach or suggest the combination of cuprous oxide in this amount with the composite material being sintered. Instead, Arakawa teaches a "blazing layer" and fails to teach or suggest a sintered composite material. The significance of this is that the sintered composite material with the amount of cuprous oxide defined in claim 19 provides for low thermal expansivity, high thermal conductivity and good plastic workability. Inasmuch as Arakawa fails to teach the structural limitations defined by the claim concerning the amount of

cuprous oxide and the sintering of the composite material, it will also fail to achieve these advantages. Therefore, reconsideration and allowance of claim 19 and its dependent claims 20-23 is respectfully requested.

Consideration and allowance of claims 24 and 25 is also respectfully requested. Claim 24 defines the composite material containing cuprous oxide in the more specific amount of 40-80vol%. Claim 25 defines the composite material as being comprised of metal and inorganic particles. Again, claim 25 specifies that the composite material is sintered, contrary to the teachings of Arakawa. Claim 25 also defines that the inorganic particles are dispersed in the composite material and obtained by plastic working. By virtue of this, significant improvements are obtained in terms of low thermal expansivity and high thermal conductivity. These features will be lacking from Arakawa. Accordingly, reconsideration and allowance of newly presented claims 24 and 25 is also respectfully requested.

Attached hereto is a marked-up version of the changes made to the title, specification, claims and abstract by the current amendment. The attached page is captioned "Version with markings to show changes made."


If the Examiner believes that there are any other points which may be clarified or otherwise disposed of, either by telephone discussion or by personal interview, the Examiner is invited to contact applicants' undersigned attorney at the number indicated below.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of

Antonelli, Terry, Stout & Kraus, Deposit Account No. 01-2135 (501.38171X00).

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By 
Gregory E. Montone
Registration No. 28,141

GEM/kd
703/312-6600

FAX RECEIVED

DEC 03 2002

TECHNOLOGY CENTER 2800

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Title

The title has been amended as follows:

-- COMPOSITE MATERIAL INCLUDING COPPER AND CUPROUS OXIDE AND
APPLICATION THEREOF --

In the Specification

Page 38 and continuing through page 39, paragraph beginning at line 17, has been amended as indicated below:

The resin-sealed package is shown in Fig. 19. The IC 65 is bonded to the nickel-plated radiator plate 67 of the present invention with the Au-Si alloy 66. It is further bonded to the copper grounding plate 69 and the nickel-plated radiator plate 70 of the present invention with the heat-conductive resin 68. On the other hand, the terminal of the IC is connected to the TAB 72 (including layers 72A and 72B) though the Au bump 71 and sealed with the resin 73. The lead frame 57 and the radiator plate are partly exposed to the outside from the sealing resin. The TAB is fixed to the copper grounding plate with an epoxy-based silver paste 74.

In the Claims:

Claims 1-18 have been cancelled without prejudice.

New claims 19-25 have been added.

In the Abstract:

The abstract has been amended as follows:

[It is an object of the present invention to provide a] A composite material [having] is provided, which has a low thermal expansivity, a high thermal conductivity, and a good plastic workability, which [is] composite material may be applied to semiconductor devices and many other uses. The composite material is composed of metal and inorganic particles having a smaller coefficient of thermal expansion than [said] the metal. It is characterized in that [said] the inorganic particles [disperse] are dispersed in such a way that 95% or more of them (in terms of their area in cross-section) form aggregates of complex configuration [joining] joined together. The composite material contains 20-80 vol% of copper oxide, with the remainder being copper. It has a coefficient of thermal expansion of 5×10^{-6} to $14 \times 10^{-6}/^{\circ}\text{C}$ and thermal conductivity of 30-325 W/m \cdot K in the range of room temperature to 300° C. It is suitable for the radiator plate of semiconductor devices and the dielectric plate of electrostatic attractors.